MONITORING APPENDIX

PLANNING AREA

INTRODUCTION

For each resource, there are a series of items that will be monitored. Each item is evaluated by location, technique for data gathering, unit of measure, frequency, remedial action threshold, and management option (Table 1). The monitoring and evaluation plan states the event that will be evaluated and lists the key resources that will be managed in the planning area. If an adverse impact can be corrected by a management action within the scope of this plan, the change will be implemented. If the adverse impact can be corrected only by a management action that is outside the scope of this plan, the management change will be a formal amendment.

TABLE 1. MONITORING TABLE							
Element	**Item**	**Location**	**Technique**	**Unit of Measure**	**Frequency and Duration**	**Remedial Action Threshold**	**Management Options**
AIR RESOURCES AND CLIMATE							
Air Resources and Climate	Gaseous and particulate regulated air pollutants and air quality related values (AQRVs), such as acid deposition, lake acidification, and visibility	Area-wide	Air quality photochemical grid modeling	Micrograms/cubic meter (µg/m$^{3)}$ and parts per million (ppm) concentrations (as µg/m^3)	Modeling will be performed when adequate data are available to validate model performance (see the *Air Resources and Climate Appendix*)	Predicted exceedances of National Ambient Air Quality Standards (NAAQS) or Montana Ambient Air Quality Standards (MAAQS) or unacceptable impacts to AQRVs	Implement additional emission controls or operating limits
	Gaseous and particulate regulated air pollutants	Sidney, Birney, and Broadus area	Continued automated sampling and analysis	µg/m^3 and ppm concentrations (as µg/m^3)	Continuous	Measured exceedances of NAAQS or MAAQS	Implement additional emission controls or operating limits
	Climate indicators including temperature, precipitation, precipitation timing and intensity, snowfall, snow pack, albedo, greenhouse gas (GHG) concentrations	Area-wide	Analysis of existing climatic data and climate change data available from the National Oceanic and Atmospheric Administration, the Western Regional Climate Center, United States	Degrees Fahrenheit (°F), degrees Celsius (°C), inches, feet, unitless (albedo), ppm, parts per billion	Annual	None (actions triggered based on resource-specific concerns)	Provide annual updates summarizing recent climate trends to BLM resource management personnel

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Element	**Item**	**Location**	**Technique**	**Unit of Measure**	**Frequency and Duration**	**Remedial Action Threshold**	**Management Options**
			Environmental Protection Agency (USEPA), and other reliable sources of information				
SOILS							
Soils	Soil erosion, uplands	Area-wide where management activities are occurring or expected to occur	Visual observation, photo point, rangeland health assessment, surface aggregate stability test, silt fence, and surveyed erosion pins	Soil loss in tons per acre	Site will be visually examined quarterly. Where erosion is considered excessive, measurements of site characteristics will be taken to determine rate of soil loss.	Visual evidence of pedestal, wind scour, rill greater than 3 inches, active headcutting gully, or sheet erosion. Soil or site stability indicators are not similar to reference rangeland health conditions. Change in surface aggregate stability to a lower class. Loss of soil exceeding 10 tons per acre per year	Report exceedance to the BLM, Montana Department of Environmental Quality (MDEQ), or USEPA. Enforcement action would be taken.
Soils (cont'd)	Soil erosion,	Area-wide	Visual	Area affected in	Site would be	Visual	Report exceedance to

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Threshold	Management Options
	streambanks, riparian areas, and floodplains	along rivers and tributaries where management activities are occurring or expected to occur	observation, photo point, rangeland health or proper functioning condition (PFC) assessments, silt fence, and surveyed erosion pins	square feet or acres	visually examined quarterly. Where streambank erosion is considered excessive, measurements of site characteristics will be taken to determine soil loss.	evidence of active headcutting, channelization beyond natural conditions, or bank slump. PFC rated functional-at-risk with a downward trend or nonfunctional. A 10% increase in streambank loss.	the BLM, MDEQ, or USEPA. Enforcement action would be taken.
	Soil salinization and sodification	Area-wide where management activities were occurring or expected to occur	Visual observation, measurement of soil characteristics such as (electrical conductivity (EC), sodium adsorption ratio (SAR), exchange sodium percentage, and pH	Area affected in square feet or acres	Site would be visually examined quarterly. Where impacts to soil or vegetation were observed, measurements of site characteristics would be taken to determine salinity and sodicity levels.	A 20% increase in levels in EC, SAR, or exchange sodium percentage (EC greater than 8, SAR greater than 8, exchangeable sodium percentage greater than 10, or pH greater than 8.5)	Report exceedance to the BLM, MDEQ, or USEPA. Enforcement action would be taken.
Soils (cont'd)	Compaction	Area-wide	Visual	Lbs. per square	Site would be	When an area	Decompact or close

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		where management activities were occurring or expected to occur	inspection, penetrometer, or ratio of penetration resistance or bulk density to that of the reference area	inch, mass per volume	visually examined 1 to 2 times yearly; where compaction is considered excessive, measurements would be taken.	has a 10% increase in density or ratio of penetration resistance or bulk density to that of the reference area greater than 1 and the compacted area exceeds 10% of surface disturbance	access to compacted site until area recovers from compaction
	Rutting	Area-wide where management activities were occurring or expected to occur	Visual observation and measured depth of rut	Inches	Site would be visually examined 1 to 2 times yearly. Where rutting is considered excessive, measurements would be taken.	Ruts exceed 4 inches in depth	Close access to rutted site until soil conditions are not susceptible to rutting and are repaired.

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Threshold	Management Options
Soils (cont'd)	Subsidence of fill material	Areas where management activities required fill material	Visual observation and measured depth of subsidence	Feet	Site would be visually examined 1 to 2 times yearly. Where slumping or piping is considered excessive, measurements would be taken.	10% increase in slumping or piping depth	Close access to site until area is reclaimed
WATER							
Water	Surface water quality and quantity	In watersheds expected to be affected, potentially affected, or down gradient from coal bed natural gas (CBNG) surface discharge points or regionally at the monitoring stations identified by the interagency working group (refer to *Final Supplement to the Montana Statewide Oil and Gas*	As determined by the interagency working group (refer to the FSEIS) or water quality parameters, temperature, and discharge or stage measurements	As determined by the interagency working group (refer to the FSEIS) or feet, cubic feet per second (cfs), and standard quantitative measurements of water quality (e.g., milligrams per liter [mg/L], pH, µS/cm, and °C)	As determined by the interagency working group or based on activity plan schedule (refer to the FSEIS)	Exceedance of any parameter above the State of Montana surface water quality standards or identified BLM thresholds (refer to the FSEIS)	Report exceedances to the MDEQ, which would determine cause and take appropriate actions If monitoring indicates that BLM thresholds were met or exceeded, untreated discharge of CBNG water from federal wells would no longer be allowed upstream from that station. Previous approvals may be modified.

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		Environmental Impact Statement and Proposed Amendment of the Powder River and Billings Resource Management Plans [FSEIS]). Note that the 10% of 7Q10 criteria for untreated CBNG water would apply unless stations upstream and downstream from proposed outfalls are monitored (refer to the FSEIS).					
Water (cont'd)	Groundwater drawdown	Regionally at locations determined by the interagency working group (refer to the FSEIS)	Monitoring wells would be finished in bedrock units; especially coal seams expected to be developed for CBNG.	Depth to water reported in hundredths of feet	Depth to water measurements would be made approximately monthly to establish an initial baseline. Measurements would be made	A 20-foot decrease in static water level from seasonally adjusted mean static water level (determined	If falling water levels were determined to be caused by CBNG activity, operators must offer water well mitigation agreements to all landowners with water sources in the defined drawdown area

TABLE 1. MONITORING TABLE

Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Threshold	Management Options
					approximately quarterly thereafter unless a greater frequency was determined to be necessary. Monitoring would continue until at least 80% recovery of static water level was achieved.	from baseline data) (refer to the FSEIS)	(20 feet or greater drawdown) of their development. Hydrologic barriers, such as injection wells, may be an option in some cases to prevent drainage of American Indian gas and water resources.
Water (cont'd)	Groundwater quality and quantity	Alluvial groundwater would be monitored in stream valleys topographically down gradient from CBNG surface discharge points. Since discharge to ephemeral streams would not be allowed, these wells would be along larger streams (refer to the FSEIS).	Monitoring wells would be finished in the alluvium. Depth to water measurements and water quality parameters, including (but not limited to) pH, EC, water temperature, common ions (Sodium (Na), Magnesium (Mg), Calcium (Ca), Potassium (K), bicarbonate ($HCO_{3)}$, Sulfate ($SO_{4)}$) would be obtained.	Standard quantitative measurements of water quality and static water level (mg/L, °C, µS/cm, and hundredths of feet)	Depth to water measurements would be made approximately monthly to establish an initial baseline. Depth to water would then be collected approximately quarterly thereafter. Water quality samples would be taken approximately annually unless more frequent monitoring is needed. Monitoring would continue until at least	A change in groundwater chemistry that affects its class of use or rise in static groundwater levels of 5 feet or more that may cause impacts at the ground surface (refer to the FSEIS)	If impacts were determined to result from CBNG development, direct discharge of CBNG water into waterways in the watershed may be discontinued until modified water management plans were submitted and approved (refer to the FSEIS).

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Threshold	Management Options
					80% recovery of static water level was achieved.		
Water (cont'd)	Groundwater quality and quantity	Operators would install monitoring wells adjacent to impoundments (refer to the FSEIS).	A monitoring well would be installed within the first permeable unit and within the first groundwater encountered (up to 50 feet total depth) to determine effectiveness of infiltration; if evaporation basins were leaking, a water quality sample of the first groundwater (if encountered) would be collected to determine class of use.	Depth to water (feet to water reported in hundredths of feet). Water quality samples would be collected if rises in groundwater were observed or if water were observed in a previously dry zone.	Wells would be gauged monthly for the first year and quarterly thereafter unless a rise was observed. If a rise were observed, monitoring would be monthly. Water quality samples would be collected whenever the water level is above baseline. Monitoring would continue at least until the end of CBNG water discharge into the impoundment.	A rise of 1 foot or more in static water levels above seasonally adjusted mean water levels (determined from the first year of data) or a change in the class of use in the groundwater (refer to the FSEIS).	Any change in class of use would be reported to the MDEQ. Operators may be required to install additional monitoring wells further downgradient, or discharge into impoundments may be required to cease until a revised water management plan is submitted and approved (refer to the FSEIS)
Water (cont'd)	Springs	A network of springs determined to be fed by the regional flow system would be identified along coal	Spring discharge and water quality parameters, including (but not limited to) pH, EC, water temperature,	Discharge cubic feet per second (cfs), pH, EC (µS/cm), and water temperature (°C) would be determined in the field. Standard	Field measurement of discharge, pH, EC, and water temperature would be determined approximately	A 50% decrease in spring discharge below seasonally adjusted mean (determined	If decreased spring discharges or water quality were determined to result from CBNG activity, operators must offer spring mitigation agreements to landowners who use the

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		outcrops in the CBNG development area (refer to the FSEIS)	and common ions (Na, Mg, Ca, K, HCO_3, SO_4), would be determined from existing springs.	quantitative measurements of water quality also would be used (mg/L).	quarterly. An initial water quality sample would be collected; additional samples would be analyzed if substantial changes in the field parameters were observed.	in the first 3 years) or a significant change in water quality that affects its beneficial use (refer to the FSEIS).	spring. If the affected spring were identified as important wildlife habitat, adaptive management practices would be used at the landscape level to improve spring ecosystems. Hydrologic barriers, such as injection wells, may be an option in some cases to prevent drainage of American Indian gas and water resources (refer to the FSEIS).
Water (cont'd)	Streambank or channel alteration	Any federal area-wide action in which potential impacts from management activities are occurring or expected to occur	Monumented cross sections, longitudinal profile, visual inspection, photo point, PFC, surveyed erosion pins, and any suitable methods as described in *Grazing Management Processes and Strategies for Riparian-wetland Areas* (Wyman et al. 2006), *Bureau of Land*	Area affected in square feet or acres	Based on activity plan schedule and a minimum of once every 10 years	Trend away from objective, a 10% increase in streambank or channel alteration, exceedance of any parameter above the State of Montana surface water quality standards for sediment, total suspended solids, or	Activities would be required to be altered or discontinued in order to provide environmental factors for increasing functionality or conditions of the streams. Exceedance would be reported to BLM, MDEQ, or USEPA and enforcement action would be taken.

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Element	**Item**	**Location**	**Technique**	**Unit of Measure**	**Frequency and Duration**	**Remedial Action Threshold**	**Management Options**
			Management Prairie Stream Surveys: Study Plan (BLM 2010k), and *Stream Channel Reference Sites: An Illustrated Guide to Field Technique* (Harrelson, Rawlins, and Potyondy 1994).			turbidity without a variance.	
Water (cont'd)	Surface water quality and quantity	Any federal area-wide action in which potential impacts from management activities are occurring or expected to occur	Water quality parameters, temperature, discharge, or stage measurements	Feet, cfs, or standard quantitative measurements of water quality (e.g., mg/L, pH, µS/cm, °C)	Based on activity plan schedule	Exceedance of any parameter above the State of Montana surface water quality standards	Activities would be required to be altered or discontinued. Exceedance would be reported to BLM, MDEQ, or USEPA and enforcement action would be taken.
Water, Indian trust	Groundwater	Adjacent to the Northern Cheyenne and Crow Indian Reservations	Sampling of dedicated monitoring wells in the zones of extraction and zones above and below the expected activity; wells are to be placed in the affected	Standard quantitative measurements of water quality and measurement of depth in feet	Field measurements six times annually prior to production activities and continued throughout the activity period and for the duration of 95% of the recovery	Where site-specific studies show a potential to affect Reservation groundwater, the tribe would be consulted as to appropriate protection	The BLM would require the operators to modify federal CBNG production. Mitigation options would include reducing production rates, shutting in the well or wells, establishing a hydrologic barrier, or providing compensation to the affected tribe.

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Element	**Item**	**Location**	**Technique**	**Unit of Measure**	**Frequency and Duration**	**Remedial Action Threshold**	**Management Options**
			areas to areas unaffected by management activities		of pre-development conditions	measures and where continuous monitoring showed a drawdown of groundwater attributed to CBNG production.	
Water, Indian trust	Groundwater	Adjacent to the Northern Cheyenne and Crow Reservations	Monitoring wells would be established near the mouth of streams containing alluvium	Measurements of depth in feet	Water level measurements would be taken monthly prior to production activity and during development and water quality measurements would be taken 4 times per year	A 20% rise in the water table above its seasonally adjusted elevation, or a 2-unit increase in the SAR value	Discontinue CBNG evaporative ponds in that watershed or require ponds to be lined
VEGETATION							
Trees and shrubs	Functional habitat within desired conditions	Site-specific and landscape-level	Visual observation, photos, utilization, browse-evaluation, trend	Cover, diversity, and composition.	Varies and designed to address objectives	Failure to meet Rangeland Health Standards. Trend moving away from management	Change in livestock season-of-use, timing, intensity, frequency, and duration

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Element	**Item**	**Location**	**Technique**	**Unit of Measure**	**Frequency and Duration**	**Remedial Action Threshold**	**Management Options**
						objectives.	
Herbaceous	Functional habitat within desired conditions.	Site-specific and landscape-level	Utilization, visual observation, photos, and trend	Cover, diversity, and composition.	Varies and designed to address objectives	Failure to meet Rangeland Health Standards or trend moving away from management objectives	Change in livestock season-of-use, timing, intensity, frequency, and duration
Riparian and Wetland	Functional rating and trend	Priority allotments with allotment management plans and areas rated as non-functional or functional-at risk with downward trend	Lotic and lentic standard PFC checklist and multiple indicators monitoring techniques (see *Riparian Area Management, A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas,* Technical Reference (TR) 1737-15 [Prichard 1998] and *Riparian Area Management A User Guide to Assessing*	Miles or acres based on functional rating and trend	Once every 5 to 10 years based on priority of non-functional and functional-at risk with downward trend areas	Trend away from objective or when no improvement occurs in areas rated as non-functional and functional-at risk with downward trend	Management changes would address causes of degradation. If impacts to management changes did not maintain or improve riparian and wetland functionality, additional monitoring or project revision would be required. Oil and gas operators would be required to alter activities in order to provide environmental factors for maintaining or improving functionality of riparian and wetland areas.

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Element	**Item**	**Location**	**Technique**	**Unit of Measure**	**Frequency and Duration**	**Remedial Action Threshold**	**Management Options**
			Proper Functioning Condition and the Supporting Science for Lentic Areas, TR 1737-16 [Prichard et al. 1999])				
Invasive Species	Infestations	Inventoried infestations	Photo points, geographic information systems data, mapping, and National Invasive Species Information Management System	Infestation size, presence or absence	Annually or every 3 to 5 years and prioritized by species location and treatment method.	Expansion of weeds, Early Detection Rapid Response, new infestations in areas of high public use, and public accessible areas	Change in control method or combine multiple control methods and strategies
Fish, Aquatic and Wildlife Habitat, Including Special Status Species							
Fisheries and aquatic wildlife in prairie streams	Habitat conditions and index of biological integrity	All locations within Miles City Field Office (MCFO) prairie stream survey protocol and locations as needed due to degraded habitat, allotment	*Bureau of Land Management Prairie Stream Surveys: Study Plan* (BLM 2010k) and index of biological integrity approach following *Development and evaluation*	300 meter stream study reaches	Every 5 years (all sites or streams) As needed: as determined by a decrease in riparian conditions (e.g. declining PFC rating), water quality or water resource	Decrease in index of biological integrity score, habitat parameters, decreased riparian function, or allotment failing to meet Standards for Rangeland	Management changes would address causes of degradation. If impacts to management changes did not maintain or improve prairie stream aquatic wildlife habitat, additional monitoring or project revision would be required. Oil and gas operators would be required to alter activities in order to

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Element	**Item**	**Location**	**Technique**	**Unit of Measure**	**Frequency and Duration**	**Remedial Action Threshold**	**Management Options**
		inspections, pre- and post-development, or as other needs arise	*of a fish assemblage index of biotic integrity for Northwestern Great Plains streams* (Bramblett, Johnson, Zale, and Heggem 2005) and *Fish and Habitat Sampling Protocol for Prairie Streams* (Bramblett 2003)		parameters indicate a decline in habitat conditions, or land-use or development plans indicate a potential for deleterious impacts to habitat	Health	provide environmental factors for maintaining or improving prairie stream aquatic wildlife habitat.
Fisheries and aquatic wildlife in sport-fish reservoirs	Habitat conditions and surveys by MFWP	Designated sport-fish reservoirs	Gill netting and trapping conducted by MFWP	Acres of reservoir	1 to 5 years or determined by MFWP	Decrease in population sizes due to factors related to resource use	Management changes would address causes of degradation. If impacts of management changes did not maintain or improve sport-fish reservoir habitat, additional monitoring or project revision would be required. Oil and gas operators would be required to alter activities to provide environmental factors for maintaining or improving sport-fish reservoir habitat.

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Threshold	Management Options
Upland game birds and migratory bird species (except sage-grouse - see beginning of appendix)	Use and trend	Sharp-tailed leks or winter grounds and migratory bird species habitats	Field inspect leks/breeding bird surveys and strategies outlined in the Wildlife Appendix	Number of males/numbers and species of migratory birds	Monitoring will be tied to yearly (varies per species, 1-5 years for migratory bird species) planning with MFWP or based upon project specific need or existing requirements	Varies and is project-specific (i.e., downward trend in lek attendance)	Extension of timing or project location or re-location, stipulations or Conditions of Approval (COAs), and off-site mitigation
Threatened and endangered species and other special status wildlife species habitat	Habitat use and trends	Black-tailed prairie dog colonies, interior least terns, and special status species raptor nests	Field surveys that include aerial, boat, or ground survey methodologies	Acres and number of prairie dog colonies, least tern numbers and nesting sites, and raptor nest site surveys	Monitoring will be tied to yearly planning with MFWP or based upon project-specific need or existing requirements	Varies and is project-specific	Extension of timing or project location re-location; stipulations or COAs; off-site mitigation
Sharp-tailed grouse	Habitat condition or baseline data collection	Sharp-tailed grouse habitats	Methodologies such as line point intercept and other methodologies	Existing habitat conditions, height of residual vegetation, cover, species diversity, and potential habitat trends	Monitoring will be tied to grazing permit renewals, existing conditions, and allotments that contain a high percentage of BLM-administered lands and other	Varies and is project-specific	Mitigate potential effects of habitat conditions or loss or require changes to livestock season-of-use

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Element	**Item**	**Location**	**Technique**	**Unit of Measure**	**Frequency and Duration**	**Remedial Action Threshold**	**Management Options**
					actions that cause direct or indirect habitat loss		
Wildland Fire Management and Ecology							
Wildland Fire Management and Ecology	Fire Regime and Condition Class (FR/CC)	Area-wide	FR/CC Standard Landscape Worksheet	Composition of departure and condition classes compared to reference conditions	Field measurements evaluated on a 10-year cycle	A change in the direction of trend away from management	Implement additional vegetation or habitat treatments
CULTURAL RESOURCES							
Areas of Critical Environmental Concern (ACECs)	See *Special Designation Areas* in this table.						
Cultural Resources (cont'd)	National Historic Trails	Lewis and Clark National Historic Trail	Area inspection to look for vandalism, resource abuse, and to install photo points	Site condition	Annually	User conflicts, resource degradation, or safety hazards	Signing; site mitigation or restoration/remediation; restrict or limit surface disturbing activities
	Random sample of 10 sites	Area-wide	Site inspection	Site, surrounding area	Annually	Any noticeable trend indicating increased disturbance, natural or human-caused	Halt activity affecting sites, increase frequency and monitoring of nearby sites, evaluate damage, apply mitigation or restoration/remediation
	Site degradation caused by human activity	Significant cultural sites, area-wide	Inspection of area disturbed	Site, surrounding area	Annually	Any noticeable trend indicating	Closure of areas surrounding site to prevent further disturbance to

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Element	**Item**	**Location**	**Technique**	**Unit of Measure**	**Frequency and Duration**	**Remedial Action Threshold**	**Management Options**
Cultural Resources (cont'd)						increased human caused disturbance , such as excavations	significant cultural resources, halt activity affecting sites, increase frequency and monitoring of nearby sites, evaluate damage, apply mitigation or restoration/remediation and possible civil or criminal action
Cultural Resources (cont'd)	Environmental or naturally caused degradation, such as erosion or trampling	Significant cultural sites, area-wide	Inspection of displaced or disturbed area	Site, surrounding area	Annually	Naturally occurring accelerated loss or damage to significant cultural material	Closure of areas surrounding site to prevent further disturbance to significant cultural resources, halt activity affecting sites, increase frequency and monitoring of nearby sites, evaluate damage, apply mitigation or restoration/remediation
PALEONTOLOGICAL RESOURCES							
ACECs	See *Special Designation Areas* in this table.						
Paleontological Resources	Significant paleontological localities	Area-wide	Inspection of disturbed area	Degradation caused by human or natural activities that lead to loss of significant fossil resources	Annually	Loss or damage to significant fossil resources	Closure of areas surrounding site to prevent further disturbance to significant fossil resources; require reclamation/remediation and possible civil or criminal action
	Random	Area-wide	Inspection of	Degradation	Annually	Loss or	Closure of areas

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Threshold	Management Options
	sample of 5 sites		disturbed area	caused by human or natural activities that lead to loss of significant fossil resources		damage to significant fossil resources	surrounding site to prevent further disturbance to significant fossil resources; initiate reclamation/remediation actions
	Locality degradation caused by human activity	Significant paleontological localities	Inspection of area disturbed	Percentage of locality	Annually	Any noticeable trend indicating increased human caused disturbance such as excavations	Closure of areas surrounding site to prevent further disturbance to significant fossil resources; require reclamation/remediation and possible civil or criminal action
Paleontological Resources (cont'd)	Environmental or naturally caused degradation, such as erosion or trampling	Significant paleontological localities	Inspection of displaced or altered area	Number of fossils	Annually	Naturally occurring accelerated loss or damage to significant fossils	Closure of areas surrounding site to prevent further disturbance to significant fossil resources; initiate reclamation/remediation actions
VISUAL RESOURCE MANAGEMENT (VRM)							
VRM I	(see *Wilderness* in this table)						
VRM II	VRM II	See VRM	Field visit and key observation points	Photo points; Visual Contrast Rating Form	Once every 1 to 5 years	Unanticipated or unacceptable effects or conflicts occurring	Require mitigation; signing; increase enforcement visits; restrict or limit surface disturbing activities; require reclamation/remediation
VRM III/IV	Large scale-surface	Planning area	Field visit and key observation	Photos points; Visual Contrast	As the need arises	Large-scale surface-	Require mitigation

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	disturbing project		points	Rating Form		disturbing project on landscape	
LANDS WITH WILDERNESS CHARACTERISTICS							
LWCs	MCFO LWCs	Devils Creek	Flight, vehicle, and foot review	Surface disturbance	Once every year	Unauthorized actions	Require reclamation/remediation or possible civil or criminal action and public notification
FORESTRY AND WOODLAND PRODUCTS							
Forestry and Woodland Products (cont'd)	Reforestation	MCFO	Site inspection and stocking surveys	Trees per acre and visual evaluation of tree vigor	Initial survey 10 years after harvest or wildfire; subsequent survey after 15 years to determine if artificial regeneration is necessary	Less than 150 trees per acre; trees greater than 4.6 inches diameter at breast height	Planting of nursery stock or broadcast seeding
	Silvicultural treatments	MCFO	Site inspection	Trees per acre; basal area per acre; volume per acre (thousand board feet per acre); and size classes; visual evaluation of forest health	Pre- and post-treatment	Obtain current stand data information and evaluate effects of treatments	Stocking surveys, stand exams, forest inventory, permanent plots, and photo points
	Forest health	MCFO	National Agricultural Imagery Program photography,	Visual evaluation	Annually	Evaluate insect and disease damage and tree mortality	Silvicultural treatments, sanitation harvest, chemical application (e.g., verbenone, carbaryl)

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			aerial detection surveys, site visits			levels	
	Roads	MCFO	Site Inspection	Visual Evaluation	Pre- and post-treatment	Damage to road surface (e.g., rutting, erosion, sediment delivery, or culvert washouts)	Culvert replacement or installation, rolling dips, proper drainage and road placement, reconstruction, cut and fill slope stabilization, surface blading, grass seeding, armoring, road closures, timing restrictions, and other activities *(see Best Management Practices Appendix.)*
MINERALS							
Coal	Exploration license	Area-wide	Site inspection	Exploration license	The regulations at 43 CFR 3480.06(d)(4) require inspections of exploration and production as frequently as necessary, but at least quarterly. Exploration license areas must be inspected for compliance with site-specific stipulations, terms and	Non-compliance with the terms and conditions of the exploration license, or operating regulations; poor reclamation; or environmental degradation	Require compliance with terms and conditions of the license, require appropriate reclamation, and eliminate environmental degradation

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					conditions of the license, and reclamation success prior to bond release. Because exploration licenses expire after 2 years license areas are typically inspected after expiration of the license but prior to bond release (or sooner if requested by the proponent).		
Oil, Gas, and Geothermal	Geophysical notice of intent (NOI)	Area-wide	Line or area inspection	Operations conducted in compliance with NOI	Minimum of once during operations	Violation of regulations, change from approved NOI	Issue certified letter with corrective action and timeframe; bond release cannot occur until violations are corrected
Oil, Gas, and Geothermal (cont'd)	Geophysical notice of completion	Area-wide	Line or area inspection	Operations conducted in compliance with notice of completion	Minimum of once during operations, once after reclamation	Violation of regulations, change from approved notice of completion	Issue certified letter with corrective action and timeframe; bond release cannot occur until violations are corrected
	Application for permit to drill operations (surface and technical inspections)	Area-wide	Site inspection	Operations conducted in compliance with applications for permit to drill	Surface Inspections: construction, drilling, and production – Minimum of	Violations of regulations, change from approved applications for permit to	Issue a written order or an incident of non-compliance with timeframe to correct violations or shut in operations

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Threshold	Management Options
					once and as necessary Interim and final reclamation – minimum of once and until reclamation is complete Technical inspection: drilling and production – minimum of once and as necessary	drill	
Oil, Gas, and Geothermal (cont'd)	Sundry notice	Area-wide	Site inspection	Operations conducted in compliance with approved sundry notice	As necessary	Violations of regulations, change from approved sundry notice	Issue a written order or an incident of non-compliance with timeframe to correct or shut in operations
	Oil and gas drainage	Area-wide	Drainage evaluation	Radius of drainage	As necessary	The BLM determines that federal oil or gas is being drained (physically removed) by an off-lease well.	Notify lessee of drainage situation. Require lease protection, compensatory royalty, or relinquishment
	Produced water disposal	Area-wide	Site inspection	Operations conducted in compliance with permit	Minimum of once annually or as necessary	Violation of regulations or change from approved permit	Issue a written order or an incident of non-compliance with timeframe to correct or shut in operations

TABLE 1. MONITORING TABLE							
Element	**Item**	**Location**	**Technique**	**Unit of Measure**	**Frequency and Duration**	**Remedial Action Threshold**	**Management Options**
	Spill	Area-wide	Site inspection	Spill area cleaned up and reclaimed	Minimum of once after event and as necessary	Violation of regulations or change from approved permit	Issue a written order or an incident of non-compliance with timeframe for correction
Oil, Gas, and Geothermal (cont'd)	Plugging operations	Area-wide	Site inspection	Operations conducted in compliance with permit	Minimum of once during operations and as necessary	Violation of regulations or change from approved permit	Issue a written order or an incident of non-compliance with timeframe for correction or shut in operations
Locatable Minerals	NOIs	Area-wide	Site inspection	NOI	At least four times each year, the responsible field office would inspect an operation if the operator uses cyanide or other leachates or where there is significant potential for acidic or deleterious drainage(43 CFR 3809.600(b). active notices and plans that do not involve leachates should be inspected at least two times	Non-compliance with the terms and conditions of the NOI or Plan of Operations, surface management regulations, poor reclamation, or environmental degradation	Require compliance with the terms and conditions of the NOI or Plan of Operations, surface management regulations, and require that reclamation was appropriately completed and environmental degradation did not occur.

TABLE 1. MONITORING TABLE							
Element	**Item**	**Location**	**Technique**	**Unit of Measure**	**Frequency and Duration**	**Remedial Action Threshold**	**Management Options**
					per year. These inspection frequencies are minimums; field offices are encouraged to conduct inspections on a more frequent basis where it is deemed necessary. MCFO currently has no plans or notices that use leachates.		
Mineral Materials	Permits and contracts	Area-wide	Site visit	Permits and contracts	Inspections are required at least once per year for sales less than 5,000 cubic yards and twice per year for sales larger than 5,000 cubic yards.	Non-compliance with the terms and conditions of the permit or contract, regulations, poor reclamation, or environmental degradation	Require compliance with the terms and conditions of the permit or contract, regulations, and require that reclamation was appropriately completed and environmental degradation did not occur.

RECREATION							
Recreation (cont'd)	General recreation use	Area-wide with emphasis on dispersed use of undeveloped recreational sites (extensive recreation management areas)	Area inspection to look for vandalism and resource abuse and to install photo points	Site condition	Twice a year (e.g., once in June and once in October) and photograph annually	User conflicts, resource degradation, or safety hazards	Signing, fencing or other mitigation measures
	Concentrated recreation use and demand	Special recreation management areas and sites with recreation facilities	Visitor registration, traffic counters, estimates, and photo points	Visitor days and site condition	Visitor registration boxes and counters checked once monthly (at the minimum) and weekly or biweekly during heavy use periods; photograph annually	Increased visitor use per year or sustained use that requires additional or improved facilities	Monitor more frequently and signing, fencing, or other mitigation measures
		Area-wide commercial and competitive activities (special recreation permits)	Administrative review and site inspection or reviews for permittees with permit stipulations	Permit stipulations, resource condition, and success of reclamation	On site during competitive events, periodic site inspection for commercial operations, and administrative review annually	Violation of permit stipulations, irreparable resource damage, and compromised visitor safety and recreation experience	Monitor more frequently and signing, fencing, or other mitigation measures
RENEWABLE ENERGY							
Renewable Energy (cont'd)	ROWs	Area-wide	Site inspection	ROW	Minimum of once during or for construction within 5 years of issuance, then in the 20th year after issuance and every 10 years thereafter; before release or collection of a bond; before renewal	Nonuse of the ROW or violation of ROW grant stipulations,	Require compliance with ROW grant stipulations,

					termination or relinquishment acceptance; or as required by specific terms and conditions in the ROW grant or the plan of development (POD) or regulations	the terms of the POD, or regulations	POD terms, or regulations with possible suspension or termination for non-compliance or nonuse
TRAVEL MANAGEMENT AND OHV AND BACK COUNTRY BYWAYS							
Travel Management and OHV and Back Country Byways	Track progress on implementation or planning signing, and mapping	Planning-area-wide	Field trips and localized public meetings	Verify minimized resource damage, user conflicts, and new user-created roads	Annual	Effects not anticipated in EIS or unacceptable effects	Require further mitigation or reclamation; restrict or limit surface disturbing activities
LANDS AND REALTY							
Lands and Realty	ROWs	Area-wide	Site inspection	ROW	Minimum of once during or for construction within 2 years of issuance for Mineral Leasing Act reviews and within 5 years of issuance for Federal Land and Policy Management Act reviews, then in the 20th year after issuance and every 10 years thereafter; before release or collection of a bond; before renewal termination or relinquishment acceptance; or as required	Nonuse of the ROW or violation of ROW grant stipulations, the terms of the POD, or regulations	Require compliance with ROW grant stipulations, POD terms, or regulations with possible suspension or termination for non-compliance or nonuse

					by specific terms and conditions in the ROW grant or the POD or regulations		
Lands and Realty (cont'd)	2920 Land Use Permits and Leases	Area-wide	Site inspection	Lease or Permit	Minimum of once during or for construction within 2 years of issuance; before release or collection of a bond; before renewal termination or relinquishment acceptance; or as required by specific terms and conditions in the lease or permit or the POD or regulations	Nonuse of the lease or permit or violation of lease or permit stipulations, the terms of the POD, or regulations	Require compliance with lease or permit stipulations, POD terms, or regulations with possible suspension or termination for non-compliance or nonuse
	Other Land Use Authorizations	Area-wide	Site inspection	Use Authorization	Minimum of once during or for construction; before release or collection of a bond; before renewal termination or relinquishment acceptance; or as required by specific terms and conditions in the authorization or the POD or regulations	Nonuse of the authorization or violation of authorization stipulations, the terms of the POD, or regulations	Require compliance with authorization stipulations, POD terms, or regulations; with possible suspension or termination for non-compliance or nonuse

SPECIAL DESIGNATION AREAS							
ACECs	MCFO ACECs	All	Site inspection	Site, surrounding area	Annually	Any noticeable trend indicating increased disturbance, natural or human-caused	Increase frequency of monitoring to ensure ACEC values were not being impaired; require reclamation/remediation or possible civil or criminal action
Wilderness Study Areas	MCFO WSAs	All WSAs	Flight, vehicle, and foot review	Surface disturbance	Once per month if the area is accessible unless an alternate schedule is approved by the State Director	Unauthorized actions	Require reclamation/remediation or possible civil or criminal action and public notification